CLAIMS:

1.   A method of channel estimation in a cellular communication
system in which symbols are transmitted between a mobile station
and a base station, the method comprising:

        receiving via a communication channel an incoming signal;
        providing a first estimate for the channel impulse response
of that communication channel and utilising that first estimate
to process the incoming signal to generate an estimated data
symbol;
        using said estimated data symbol to generate a soft output
feedback decision; and
        using the soft output feedback decision to make a further
estimate of the channel impulse response.

2.   A method according to claim 1, wherein the incoming signal
incorporates symbols spread by a spreading code in a CDMA system.

3.   A method according to claim 2, wherein the channel impulse
response is estimated by performing a correlation process between
a conjugate version of the spreading code and the incoming
signal, and multiplying the results of that process by the soft
feedback decision value as a weighting value for the channel
impulse response.

4.   A method according to any preceding claim, wherein the
incoming signal includes data symbols and pilot symbols, a unique
spreading code having been used respectively for pilot symbols
and data symbols.

5.   A method according to claim 2 or 4, in which a long
spreading code has additionally been used to spread the symbols
prior to transmission.

6.   A method of channel estimation in a cellular communication
system in which symbols are transmitted between a mobile station
and a base station, the method comprising:

receiving via a communication channel an incoming signal which incorporates symbols spread by a spreading code;

providing a first estimate for the channel impulse response of that communication channel and utilising that first estimate to process the incoming signal to generate an estimated data symbol;

making a further estimate of the channel impulse response by performing a correlation process between a conjugate version of the spreading code and the incoming signal, and multiplying the results of that process by a feedback decision based on said estimated data symbol as a weighting value for the channel impulse response.

7. A method according to claim 6, wherein the feedback decision is a soft output.

8. A method according to claim 6, wherein the feedback decision is a hard output.

9. Circuitry for estimating a channel impulse response in a cellular communication system in which symbols are transmitted between a mobile station and a base station, the circuitry comprising:

a receiver for receiving via a communication channel an in coming signal which incorporates symbols spread by a spreading code;

a channel impulse response generator for providing a first estimate for the channel impulse response of that communication channel;

a data symbol generator for generating an estimated data symbol using the first estimate of the channel impulse response;

circuitry for providing a further estimate of the channel impulse response by performing a correlation process between a conjugate version of the spreading code and the incoming signal, and multiplying the results of that process by a feedback decision based on said estimated data symbol as a weighting value for the further estimate of the channel impulse response.

10. Circuitry for estimating a channel in a cellular communication system in which symbols are transmitted between a mobile station and a base station, the circuitry comprising:

a receiver for receiving an incoming signal via a communication channel;

a channel impulse response generator for providing a first estimate for the channel impulse response of that communication channel;

a data symbols generator for generating an estimated data symbol using that first estimate;

a soft output feedback decision generator for using said estimated data symbol to generate a soft output feedback decision;

wherein the soft output feedback decision is used to make a further estimate of the channel impulse response.